



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

OFFICE OF CHEMICAL SAFETY
AND POLLUTION PREVENTION

October 3, 2019

Craig N. Thatcher
President
Thatcher Group, Inc.
P.O. Box 27407
Salt Lake City, UT 84127-0407

Subject: Notification per PRN 98-10 – Application to Correct Typographical Errors and Add
“Not for Use in CA” Statement to Specific Use Sites.
Product Name: “Chlorine Liquified Gas Under Pressure”
EPA Registration Number: 8996-6
Application Date: June 14, 2019
Decision Number: 554326

Dear Mr. Thatcher:

The Agency is in receipt of your Application for Pesticide Notification under Pesticide Registration Notice (PRN) 98-10 for the above referenced product. The Antimicrobials Division (AD) has conducted a review of this request for its applicability under PRN 98-10 and finds that the action requested falls within the scope of PRN 98-10.

The label submitted with the application has been stamped “Notification” and will be placed in our records.

Should you wish to add/retain a reference to the company’s website on your label, then please be aware that the website becomes labeling under the Federal Insecticide Fungicide and Rodenticide Act and is subject to review by the Agency. If the website is false or misleading, the product would be misbranded and unlawful to sell or distribute under FIFRA section 12(a)(1)(E). 40 CFR 156.10(a)(5) list examples of statements EPA may consider false or misleading. In addition, regardless of whether a website is referenced on your product’s label, claims made on the website may not substantially differ from those claims approved through the registration process. Therefore, should the Agency find or if it is brought to our attention that a website contains false or misleading statements or claims substantially differing from the EPA approved registration, the website will be referred to the EPA’s Office of Enforcement and Compliance.

If you have any questions, you may contact Michael Varco at 703-347-0403 or via email at Varco.Michael@epa.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "D. Fuller".

Demson Fuller, Product Manager 32
Regulatory Management Branch II
Antimicrobials Division (7510P)
Office of Pesticide Programs

NOTIFICATION

8996-6

The applicant has certified that no changes, other than those reported to the Agency have been made to the labeling. The Agency acknowledges this notification by letter dated:

10/03/19

For Use by Trained Commercial Applicators

**CHLORINE
LIQUIFIED GAS UNDER PRESSURE**

FOR USE AS A DISINFECTANT AND/OR ALGICIDE, by experienced personnel only, in municipal water supplies, sewage and waste management plants, and in commercial and industrial swimming pools; as a slimicide in water cooling systems and in paper mills; for bacteria, algae, slime build-up and clogging in irrigation systems; for sanitizing non porous food contact surfaces; for treating fruit and vegetables; and in repackaging into portable cylinders. Re-packagers must obtain their own registration with Environmental Protection Agency.

Certified to NSF/ANSI Standard 60. Maximum Use Level in potable water is 30mg/L.

ACTIVE INGREDIENT: Chlorine 99.50%
OTHER INGREDIENTS: 0.50%

KEEP OUT OF REACH OF CHILDREN

DANGER  POISON

FATAL IF INHALED.
LIQUID CAUSES SEVERE BURNS

EPA Reg. No. 8996-6

EPA Est. No. 8996-NV-01
8996-CA-01

See Bill of Lading for specific establishment number

Thatcher Group, Inc.
P.O. Box 27407
Salt Lake City, UT 84127-0407
801-972-4587

NET CONTENTS: 150 # 2000 # Other _____

“SEE BACK PANEL FOR ADDITIONAL PRECAUTIONS”

PRECAUTIONARY STATEMENTS

FIRST AID

IF INHALED: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferable mouth-to-mouth if possible. Call a poison control center or doctor for treatment advice.

IF ON SKIN OR CLOTHING: Take off contaminated clothing immediately. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first five minutes, then continue rinsing. Call

a poison control center or doctor for treatment advice.

IF SWALLOWED: Call a poison control center or doctor immediately for treatment advice. Have a person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

NOTE TO PHYSICIAN: Symptoms may become more severe up to 36 hours after exposure including pulmonary edema. Probable mucosa! damage may contraindicate the use of gastric-lavage.

HAVE THE PRODUCT CONTAINER OR LABEL WITH YOU WHEN CALLING A POISON CONTROL CENTER OR MEDICAL PHYSICIAN, OR GOING FOR TREATMENT.

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

DANGER: Corrosive. Causes irreversible eye damage and skin burns. Fatal if swallowed inhaled or absorbed through skin. Do not get in eyes, on skin or clothing. Do not breathe vapors. Wear goggles, protective clothing and rubber gloves as discussed below. Wash thoroughly with soap and water after handling and before eating, drinking, using the toilet, or using tobacco. Remove contaminated clothing and wash before reuse.

PERSONAL PROTECTIVE EQUIPMENT: Handlers must wear long-sleeved shirts, long pants, shoes, and socks.

IN CASE OF SPILL OR LEAKAGE: Handlers must wear chemical-resistant, waterproof, insulated gloves (such as nitrite of butyl), rubber boots and full-face respirators approved for chlorine (MSHA/NIOSH approval number prefix TC-14G) or self contained breathing apparatus (SCBA) (MSHA/NIOSH approval number prefix TC-13F). Since there is always the possibility of a spill or a leak, gloves and a respirator of a type specified above must be available and are required for anyone entering into an affected area in the event of a leak or spill.

ENVIRONMENTAL HAZARDS: This pesticide is toxic or highly toxic to fish and aquatic invertebrates. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the Environmental Protection Agency.

PHYSICAL & CHEMICAL HAZARDS: Chlorine is a non-flammable gas, liquefied, under pressure. Do not drop container. Do not heat container. Keep away from intense heat or open sunlight. Corrosive to most metals in the presence of moisture.

STORAGE & DISPOSAL

STORAGE: Store cylinders and ton containers in a dry area away from sources of heat and protected from direct sunlight and precipitation. Do not store in excessive heat. Segregate chlorine containers from other compressed gases, and never store near hydrocarbons, finely divided metals such as filings or granules, turpentine, ether, anhydrous ammonia, or other flammable materials. All storage containers and cylinders must have a weather

resistant label and must not be accessible to the general public. Do not drop container. If container is damaged or leaking, notify supplier immediately.

DISPOSAL OF CONTAINER: Container is returnable and must be properly identified with return tag and returned as promptly as possible to the supplier according to prescribed instructions and practices. All valves must be closed tight and closures or caps secured. It is illegal to ship a leaking chlorine container.

Refillable container. Refill this container with Chlorine Gas only. Do not reuse this container for any other purpose.

LEAK PROCEDURES: Make daily inspections for leaks. Stop a leak at once, since it will become worse with time.

In case of a leak, evacuate everyone from the immediate area. For entry into the affected area to correct problem, wear personal protective equipment (including prescribed respirators) specified in the Hazards to Humans section of the labeling. When possible, move leaking or damaged cylinders outdoors or to an isolated location. Observe strict safety precautions. Work upwind, if possible. Allow any liquid chlorine to evaporate. Only correctly trained and Personal Protective Equipment (PPE)-equipped handlers are to perform such cleanup. Do not permit entry into the leak area by any other person until the chlorine has completely dispersed.

<p style="text-align: center;">DIRECTIONS FOR USE</p> <p style="text-align: center;">GENERAL CLASSIFICATION</p>

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Have available respirators approved by the National Institute for Occupational Safety and Health. Handle and use only in accordance with practices recommended in the Chlorine Manual published by the Chlorine Institute, Inc., Virginia. Use only in well ventilated areas.

Only specifically designed dispensing equipment should be used in accordance with manufacturer's instructions and according to state regulatory agency recommendations for dosages or residual chlorine levels which should be maintained for each specific site application. FOR USE AS A DISINFECTANT AND/OR ALGICIDE, by experienced personnel only, in municipal water supplies, sewage and waste management plants, and in commercial and industrial swimming pools; as a slimicide in water cooling systems and in paper mills and in repackaging into portable cylinders. The "Booklet-Additional Use Instructions" includes specific directions for use of this product for bacteria, algae, slime build-up and clogging in irrigation systems; for sanitizing non porous and porous food contact surfaces; and for treating fruit and vegetables. Re-packagers must obtain their own registration with Environmental Protection Agency.

CLEANING FORMULATIONS, BLEACHING, & NON-PESTICIDE CHEMICAL MANUFACTURING: This product may be used for cleaning formulations, bleaching and non-pesticide chemical manufacturing. Only specifically designed handling and dispensing equipment should be used in accordance with manufacture's instructions and according to operating instructions or product formulations defined by the use facility.

Thatcher Group, Inc.

CHLORINE

Liquified Gas Under Pressure

Booklet -- Additional Use Instructions See Label for additional information

AGRICULTURAL USES

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Workers Protection Standard.

The Restricted-Entry Interval (REI) is 0 days when using this product.

There are no posting or notification requirements when using this product.

Personal Protective Equipment should be worn as described under the "Precautionary Statements" section of this label.

BACTERIA, ALGAE, SLIME BUILD-UP AND CLOGGING IN IRRIGATION SYSTEMS

This product is to be applied through drip/trickle sprinkler irrigation systems only for agricultural crops and only where this manner of use will not cause crop damage. As packaged, chlorine gas has 99.5% or higher chlorine content. While using chlorine gas is generally considered the least

expensive method of applying chlorine, it is also hazardous if used without following the direction of trained or qualified service personnel.

Irrigators wishing to apply chlorine gas should use suitably designed vacuum injector equipment (Venturi ejector device) rated for chlorine. Do not attempt to use ejectors designed for other purposes (such as fertigation) because crop injury, hazardous equipment failure and/or lack of product effectiveness can result. Questions regarding equipment use and calibration should be directed to chlorine suppliers or other experts such as your state or local Agriculture Research Center.

DO NOT connect any irrigation system, including greenhouse systems into which chlorine is to be added, to a public water system unless safety devices prescribed by the state Department of Health, Safe Drinking Water Branch, for cross connection protection are in place.

A certified applicator or someone under the direct supervision of a certified applicator shall start up, shut down, and make necessary adjustments to the system as needed to maintain proper performance of the chlorine application and compliance with this label.

CALIBRATION - If the irrigation water has high levels of nutrients causing bacterial, algae, or other bio-fouling that reduces system performance, continuous chlorination may be necessary. The recommended level of free residual chlorine for continuous feed is 1 to 2 ppm, measured at the end of the farthest lateral using a good quality test kit for free chlorine (also called "free residual" or "free available" chlorine).

Periodic shock treatments at a higher chlorine rate of up to 20 ppm free residual may be appropriate where bacteria and/or algae clogging and build-up are not managed by maintaining a continuous residual. The frequency of the chlorine shock application depends upon the frequency and extent of bio-clogging.

Superchlorination, bringing chlorine concentrations to as much as 100 ppm total chlorine, is recommended for reclaiming low-volume irrigation systems if clogged by algae and bacterial slimes. Set the chlorinator to deliver 100 ppm in the drip system and monitor the free chlorine residual at the end of the farthest lateral. As soon as it is established that the free residual reading is between 10 and 20 ppm, shut the system down and leave it undisturbed for up to 24 hours. Then flush all sub-mains and laterals with fresh water. Superchlorination will not dissolve or remove scale or inorganic sediment fouling.

end of the treated increment in the field and adjust the chlorine gas dose setting until the desired free chlorine concentration is obtained. Only experience can establish the actual chlorinator settings required to provide the amount of free chlorine at the end of the farthest lateral (and consequent treatment of the irrigation system).

Chlorination should be started during irrigation, near the end of the irrigation sequence, but early enough to establish the desired free chlorine concentration throughout the system being treated. Apply the chlorine upstream of the filter to help keep the filter clean. Determine the level of free chlorine as described in the "Calibration" section, above, using a free chlorine test kit. Allow sufficient time to achieve a steady reading.

DO NOT apply chlorine when fertilizers, herbicides, and insecticides are being injected since they will consume the chlorine and may produce toxic reaction products.

Shut down the chlorine feed as soon as the irrigation water is switched to the next irrigation sector. Leave the treated water residing in the section which has been shut down.

If its source water is connected to a potable water system, the irrigation water system must contain a functional reduced pressure - principle back-flow prevention device approved by your state Department of Health, appropriately situated to prevent contamination of the potable water system. This device must be certified operational by an agent authorized for making certifications by the state Department of Health.

The chlorine vacuum ejector must contain a functional, integral check valve to prevent the flow of water into the chlorine line, toward the chlorine regulator. The chlorine vacuum line may also contain an optional chlorine-rated, normally-closed solenoid valve connected to a system power interlock and/or a secondary vacuum check valve for additional protection of the chlorine regulator.

The chlorine gas application rate can be determined from the following formula:

$$\begin{array}{ccccccc} \text{Chlorine Gas} & & & & & & \\ \text{Injection} & & & & & & \\ \text{Rate in} & = & \text{System} & \times & \text{Desired Chlorine} & \times & \\ \text{lbs./day} & & \text{Flow Rate} & & \text{Concentration in} & & \\ & & \text{in gpm} & & \text{ppm} & & \\ & & & & & & 0.012 \end{array}$$

Example:

How much chlorine will be required daily to obtain 2 ppm available chlorine with a water flow rate of 1500 gallons per minute?

$$\begin{array}{ccccccc} \text{Chlorine Gas} & & & & & & \\ \text{Injection} & = & 1500 \text{ gpm} & \times & 2.0 \text{ ppm} & \times & \\ \text{Rate in} & & & & & & \\ \text{lbs./day} & & & & & & 0.012 \end{array}$$

Chlorine Gas Injection Rate == 36 lbs. /day

NOTE: This calculation, when applied to clean water which is free of amine nitrogen and organic nutrients, will give a result close to the actual chlorine gas dose setting required. In this case, the chlorine gas dose rate (in ppm) approximately equals the desired free chlorine concentration (in ppm). In actual practice, however, contaminants in the water may consume chlorine such that the desired free chlorine concentration is less than the chlorine gas dose rate as calculated above. To correctly establish the chlorine gas dose setting required, it is necessary to measure the free chlorine concentration (ppm) at the

SENSITIVE PLANT SPECIES - Certain plants, including various species of trees, flowers, shrubs, agronomic crops, fruits and vegetables are adversely affected by chlorinated irrigation. The use of this product can impact the growth, appearance and health of the plants.

Applications of chlorine in irrigation systems must be done by a certified applicator and, if necessary, on a trial basis until sufficient experience relative to sensitive plants, including crops and their specific varieties, is gained.

Begonias, geraniums and other ornamental plant species are known to be sensitive to continuous chlorination at levels of 1-2 ppm free chlorine. Plant species such as tomato, lettuce, broccoli, and petunia are sensitive to periodic chlorination levels of 10-20 ppm free chlorine.

If uncertain of a plant's tolerance, consult an agronomist or a support agency such as your local University Extension Service or use an alternate method to remove bio-fouling from the irrigation system.

NON AGRICULTURAL USES

SANITIZING HARD NON POROUS FOOD CONTACT SURFACES

Sanitizers used in automated systems may be used for general cleaning but may not be re-used for sanitizing purposes.

RINSE METHOD - A solution of 100 ppm available chlorine may be used in the sanitizing solution. Solutions containing an initial concentration of 100 ppm available chlorine must be tested and adjusted periodically to insure that the available chlorine does not drop below 50 ppm. Prepare a 100 ppm sanitizing solution. Check the concentration of available chlorine using a chlorine test kit.

Clean equipment surfaces in the normal manner. Remove all soils and food particles by flushing, scraping and/or pre-soaking. Wash thoroughly with a good detergent followed by a potable water rinse. Prior to use, rinse all surfaces thoroughly with the sanitizing solution, maintaining contact with the sanitizer for at least 2 minutes. If solution contains less than 50 ppm available chlorine, as determined by a suitable test kit, either discard the solution or add sufficient product to re-establish a 100 ppm residual. Do not rinse equipment with water after treatment and do not soak equipment overnight.

IMMERSION METHOD - A solution of 100 ppm available chlorine may be used as the sanitizing solution. Solutions containing an initial concentration of 100 ppm available chlorine must be tested and adjusted periodically to insure that the available chlorine does not drop below 50 ppm. Prepare a 100 ppm sanitizing solution. Check the concentration of available chlorine using a chlorine test kit.

Clean equipment surfaces in the normal manner. Prior to use, immerse equipment in the sanitizing solution for at least 2 minutes and allow the sanitizer to drain. If solution contains less than 50 ppm available chlorine, as determined by a suitable test kit, either discard the solution or add sufficient product to re-establish a 100 ppm residual. Do not rinse equipment with water after treatment.

SANITIZING POROUS FOOD CONTACT SURFACES

RINSE METHOD - A solution of 600 ppm available chlorine may be used to sanitize porous food contact surfaces (i.e., wood chopping blocks). Clean surfaces in the normal manner. Rinse all surface thoroughly with the 600 ppm solution, maintaining contact with the sanitizer for at least 2 minutes. Prepare a 200 ppm sanitizing solution. Prior to using equipment, rinse all surfaces with a 200 ppm available chlorine solution. Do not rinse and do not soak equipment overnight.

IMMERSION METHOD - Prepare a 600 ppm available chlorine solution. Clean equipment in the normal manner, immerse equipment in the 600 ppm sanitizing solution for at least 2 minutes and allow the sanitizer to drain. Prepare a 200 ppm sanitizing solution. Prior to using equipment, immerse all surfaces in a 200 ppm available chlorine solution. Do not rinse and do not soak equipment overnight.

FRUIT & VEGETABLE WASHING - All fruits and vegetables should be cleaned by thoroughly washing in an appropriate cleaning solution. Remove all soils and other residues prior to treating with this product. After washing, transfer the fruit and vegetables to a separate tank containing the solution.

Apply this product at the recommended concentration of available chlorine. See the following table for recommended usage concentrations for the fruit or vegetable being processed. The use of a calcium carbonate buffer to control pH is recommended. Maintain the pH of the use solution between 6.0 and 8.0 with a dilute solution of hydrochloric acid.

For citrus quarantine, use at 200 ppm at pH 6.0 to 7.5. Apply for two minutes using a suitable spray or dip tank treatment.

DOSAGE IN FRUIT AND VEGETABLE TREATMENT
Available Chlorine Required in Treatment Water

Maintain the following temperatures: Tank/Flume: 60-70F

Spray: 65-75F

Hydrocooler: 34-45F

COMMODITY	TREATMENT METHOD	AVAILABLE CHLORINE TO APPLY (ppm)	COMMENTS
Apples	Dump Tank	100 - 150	For dump tank and flume, submerge the apples for 90 seconds For spray, maintain contact for 5 -15-seconds.
	Flume	30 - 50	
	Spray	100 - 150	
Artichokes	Spray	100 - 150	Spray for 5 — 15 seconds.
Asparagus	Spray	100 - 150	Spray for 5 — 15 seconds.
	Hydrocoole	125 - 150	Hydrocool for 20 - 30 minutes.
Bell Peppers	Dump Tank	100 - 135	Immerse in dump tank for 2 — 5 minutes. Spray for 5 — 15 seconds.
	Spray	300 - 400	
Brussels Sprouts	Spray	100 - 150	Spray for 5 — 15 seconds.
Cabbage (Chopped)	Spray	80 - 100	Spray for 5 —15 seconds. After treatment, the adhering moisture must be removed by centrifuging.
Carrots	Dump Tank	100 - 200	Immerse in dump tank or flume for 1 - 5 minutes. Spray for 5 —15 seconds.
	Flume	100 - 200	
	Spray	50 - 100	
Cauliflower	Spray	300 - 400	Spray for 5 — 15 seconds.
Celery	Spray	100	Spray for 5 —15 seconds.
Cherries	Spray	75 - 100	Spray for 5 — 15 seconds.
Garlic	Spray	75 - 100	Spray for 5 —15 seconds. Immerse in tank for 2 - 5 minutes contact.
	Tank	75 - 150	
Grapefruits	Spray	40 - 75	Spray for 5 —15 seconds. Drench for 3 - 5 minutes. For citrus quarantine treatment, use 200 ppm of available chlorine at pH 6.0 - 7.5 in drench tank.
	Drench	100 - 150	
Lemons	Dump Tank	30 - 50	Immerse in dump tank for 2 - 3 minutes.
Lettuce (butter)	Spray	10 - 20	Spray for 5 — 15 seconds.
Lettuce (chopped) (Not for use in CA)	Spray	30 - 75	Spray for 5 — 15 seconds. After treatment, the adhering moisture must be removed by centrifuging.

Onion (dry)	Spray Tank	75 - 150 75 - 150	Spray for 5 -15 seconds. Immerse in tank for 2 - 3 minutes.
Onions (green)	Spray	75 - 120	Spray for 5 -15 seconds.
Oranges	Drench Spray	100 - 200 40 - 75	Drench for 3 - 5 minutes. Spray for 5 -15 seconds.
Nectarines	Hydrocooler Spray	30 - 75 50 - 100	Hydrocool for 20 - 30 minutes. Spray for 5 -15 seconds.
Peaches	Hydrocooler Spray	30 - 75 50 - 100	Hydrocool for 20 - 30 minutes. Spray for 5 -15 seconds.
Pears	Dump Tank	200 - 300	Immerse in tank for 2 - 3 minutes
Peppers (Not for use in CA)	Spray	300 - 400	Spray for 5 -15 seconds.
Pineapples (Not for use in CA)	Spray Drench Dump Tank	100 - 150 40 - 100 30 - 100	Spray for 5 -15 seconds. Drench for 3 -5 minutes. Remove from tank after 2-5 minutes. Potable water rinse is not required for pineapple.
Plums	Hydrocooler Spray	30 - 75 50 - 100	Hydrocool for 20 - 30 minutes. Spray for 5 -15 seconds.
Potatoes (Not for use in CA)	Dump Tank Flume Spray	30 - 100 200 - 300 100 - 200	Immerse in tank or flume for 2 - 5 minutes Spray for 5 -15 seconds.
Potatoes (white)	Spray	500 - 600	This concentration of chlorine should be used only if bleaching of potatoes is desirable. Spray for 5 -20 seconds.
Radishes	Tank Spray	10 - 25 100 - 150	Immerse in tank for 1 -12 seconds Spray for 5 -15 seconds.
Spinach (Not for use in CA)	Spray	75 - 150	Spray for 5.- 15 seconds.
Tomatoes	Tank Spray	200 - 350 100 - 150	Immerse in tank for 2 - 3 minutes. Spray for 5 -15 seconds.
Yams	Tank	100 - 200	Immerse in tank for 2 - 3 minutes.

CHLORINE DOSAGE IN CONTINUOUS FLOW SYSTEMS

Weight of Chlorine Gas Required per Day

WATER FLOW		DESIRED LEVEL OF AVAILABLE CHLORINE							
G/MIN	G/DAY	0.5 ppm	1.0 ppm	2.0 ppm	3.0 ppm	4.0 ppm	5.0 ppm	6.0 ppm	8.0 ppm
10	14,400	1 oz	2 oz	4 oz	6 oz	8 oz	10 oz	12 oz	16 oz
15	21,600	1.5 oz	3 oz	6 oz	9 oz	12 oz	15 oz	18 oz	21 oz
20	28,800	2 oz	4 oz	8 oz	12 oz	16 oz	20 oz	24 oz	32 oz
30	43,200	3 oz	6 oz	12 oz	18 oz	24 oz	30 oz	36 oz	48 oz
40	57,600	4 oz	8 oz	16 oz	24 oz	32 oz	40 oz	48 oz	64 oz
50	72,000	5 oz	10 oz	20 oz	30 oz	40 oz	50 oz	60 oz	80 oz
60	86,400	6 oz	12 oz	24 oz	36 oz	48 oz	60 oz	72 oz	96 oz
70	100,800	7 oz	14 oz	28 oz	42 oz	56 oz	70 oz	84 oz	112 oz
80	115,200	8 oz	16 oz	32 oz	48 oz	64 oz	80 oz	96 oz	128 oz
90	129,600	9 oz	18 oz	36 oz	54 oz	72 oz	90 oz	108 oz	144 oz
100	144,000	10 oz	20 oz	40 oz	60 oz	80 oz	100 oz	120 oz	160 oz
150	216,000	15 oz	30 oz	60 oz	90 oz	120 oz	150 oz	180 oz	240 oz
200	288,000	20 oz	40 oz	80 oz	120 oz	160 oz	200 oz	240 oz	320 oz
300	432,000	30 oz	60 oz	120 oz	180 oz	240 oz	300 oz	360 oz	480 oz

1 lb. = 16oz

To obtain a desired chlorine level for a known water flow rate, find the desired chlorine level in ppm at the top of the chart. Follow the column down until you are opposite the flow rate for your equipment. The figure in that column is the weight of chlorine that must be added daily. If the desired chlorine level is not shown on the chart, multiply the chart values to get the correct dosage level.

Example: To obtain 4 ppm at a flow rate of 100 gallons per minute, add 80 oz or $80/16 = 5$ lb. of chlorine per day. To obtain 100 ppm at a flow rate of 60 gallons per minute, use $12 \times 100 = 1200$ oz or $1200/16 = 75$ lb. chlorine per day.

CHLORINATOR INSTRUCTION BOOKLET

SAFETY

1. Chlorine is corrosive to iron, brass and copper. Plastic lines should be used whenever practical.
2. Locate the chlorinator outside the building or room in which people normally work. Use plastic pipe to transport the chlorinated water.
3. Chlorine cylinders must be chained to a wall near a chlorinator.
4. If the chlorinator must be located inside the building, place it next to an outside wall or corner. Locate it as far away as possible from personnel.
5. Chlorine Gas label should be attached to each cylinder. Above the cylinder a sign (approximately 10 x 14 inches) stating "DANGER - CHLORINE" should be posted in clear view.
6. Chlorine is highly reactive when in contact with OPP or SOPP. DO NOT mix chlorine with water solution or wax containing OPP or SOPP.
7. When chlorine and OPP are used on the same line, chlorine treated commodities should be followed by a fresh water rinse or have a minimum interval of 10 seconds between chlorine application and OPP application to allow the chlorine to dissipate.
8. Read and follow the chlorinator manual before operating or changing the chlorine cylinder.
9. Read and follow the precautionary statements and statement of practical treatment on the label before using this product.
10. Refer to the Chlorine manual for additional safety information.

DAILY CHECK LIST

1. Check the chlorine leak— This can be done by using ammonia. White smoke appears when ammonia comes in contact with chlorine gas. If a leak is detected shut the system down completely. Do not operate the system until the leak is fixed.
2. Correct pH and chlorine concentration - These are the most important factors in determining the effectiveness of the chlorine. The chlorine concentration should be checked at least twice daily and adjustments should be made whenever necessary. Use test paper or field colorimetric test kit to determine the chlorine concentration and pH. Maintain the pH between 7.2 and 7.8.
3. Soda Ash is used as a pH buffer in the wash process. Use a 55 gallon plastic lined drum of Soda Ash. Add more when the drum is less than 3/4 full. Constant flow of fresh water to this tank is necessary. The in-flow of water should be the same as outflow of chlorinated water. Percolate the chlorine from the bottom of the tank and take the chlorinated water from the top. Maintain pH between 7.2-7.8.

CHLORINE DOSAGE IN CHLORINATOR SYSTEMS
Weight of Chlorine Gas Required per 1000 Gallons

DESIRED LEVEL OF AVAILBLE CHLORINE	CHLORINE REQUIRED PER 1000 GALLONS	DESIRED LEVEL OF AVAILBLE CHLORINE	CHLORINE REQUIRED PER 1000 GALLONS
10 ppm	1.35 oz	90 ppm	12.15 oz
20 ppm	2.70 oz	100 ppm	13.50 oz
30 ppm	4.00 oz	150 ppm	20.00 oz
40 ppm	5.40 oz	200 ppm	27.00 oz
50 ppm	6.75 oz	300 ppm	40.00 oz
60 ppm	8.00 oz	400 ppm	52.00 oz
70 ppm	9.40 oz	500 ppm	65.00 oz
80 ppm	10.80 oz	600 ppm	78.00 oz

1 lb. = 16 oz

Select the concentration (ppm) desired and add the corresponding amount of chlorine gas to 1,000 gallons of chlorine free water.

Example: For a 300 ppm chlorine solution in 1,000 gallons of water, add 40 ounces of chlorine gas to chlorine free water. For a 300 ppm chlorine solution in 5,000 gallons of water, add five times as much chlorine gas or 200 ounces.

Thatcher Group, Inc.
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801-972-4587

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EPA Est. No.: 8996-NV-01
EPA Est. No.: 8996-CA-01

Revision: 20190612